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UNITED STATES DEPARTMENT OF AGRICULTURE

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Contribution from the Office of Farm Management
H. C. TAYLOR, Chief

Washington, D. C. ▼ April 24, 1920

THE STANDARD DAY'S WORK IN CENTRAL ILLINOIS

PERFORMANCE OF IMPLEMENTS AND CREWS AS INDICATED BY REPORTS FROM 600 FARMS IN A TYPICAL CORN-BELT AREA

By

H. R. TOLLEY, Scientific Assistant, and
L. M. CHURCH, Assistant in Farm Accounting

CONTENTS

	Page		Page
Introduction	1	Husking Corn	17
Summary of Results	2	Seeding Grain	19
General Conditions	3	Harvesting Grain	21
Plowing	4	Unloading Grain	23
The Disk Harrow	9	Haying Operations	23
The Spike-Tooth Harrow	10	Hauling and Spreading Manure	24
Planting Corn	11	Comparison of Illinois and New York Practices	30
Cultivating Corn	12		
Cutting Corn	14		

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Performance of Implements and Crews as Indicated by Reports from 600 Farmers in a Typical Corn-Belt Area.

By H. R. TOLLEY, *Scientific Assistant;* L. M. CHURCH, *Assistant in Farm Accounting.*

CONTENTS.

	Page.		Page.
Introduction	1	Husking corn	17
Summary of results	2	Seeding grain	19
General conditions	3	Harvesting grain	21
Plowing	4	Unloading grain	23
The disk harrow	9	Haying operations	23
The spike-tooth harrow	10	Hauling and spreading manure	29
Planting corn	11	Comparison of Illinois and New York practices	30
Cultivating corn	12		
Cutting corn	14		

INTRODUCTION.

Data regarding the amount of work that farm implements, teams, and crews may reasonably be expected to do are of value—

1. In determining the equipment that should be used on farms of various types and sizes.

2. As a guide to the farmer who plans to locate where farming conditions are unfamiliar.

3. As a guide to the farmer who plans to change the size of his farm or his type of farming.

4. As offering the investigator more or less assistance in determining the amount and value of work necessary in the production of crops.

During the winter of 1918 and 1919 reports were obtained from nearly 600 farmers in McLean County, Ill., concerning the rate of doing work with the farm implements, teams, and crews in use there. Each of these farmers gave his estimate of an average day's work on his place for each of the field operations, and the average time required for the operations not directly measurable in terms of a day's work. The results of this inquiry are set forth in the following pages.

It will be understood that the averages here presented are to be considered as representing, in each instance, but one factor of sev-

eral that must be taken into account in working out any particular problem with regard to farm implements, teams, and workmen. Size of farm, distribution of labor, cost of operation, etc., must be known before specific application can be made of these figures. They indicate what is actually being accomplished in the average farm practice of the area. It is for the individual farmer to judge, by applying the data in the light of his own peculiar conditions, whether he is getting efficient service from his machinery and crews, and whether they are of the best size for his purpose.

While these data are strictly applicable perhaps only to the McLean County area, the practices followed on the farms in question are so typical of those of a large and widely distributed class of Corn Belt farmers that the results may be assumed to apply, at least in a broad way, to all parts of the Corn Belt where soil and conditions in general are comparable. It should be borne in mind that the figures presented do not represent actual, recorded performance, but are averages derived from careful estimates made by the 600 farmers who contributed to the making of this study.[1]

In the latter part of the bulletin figures for various farm operations, as determined by this study, are shown in comparison with figures for the same operations in western New York, as determined by a like study made there some years ago.

SUMMARY OF RESULTS.

The outstanding facts brought out by this inquiry are summarized in Table I. By reference to this table one may learn at a glance the average number of acres covered per day by these Illinois farmers in the different operations, according to size of implement or team, or the average number of minutes required per load in handling hay, ear corn, oats, and manure.

TABLE I.—*Summary of performance of implements, workmen, and crews in most common use in central Illinois.*

Implement or operation.	Size.	Horses.	Men.	Acres per day.
Sulky plow:				
Spring plowing	16 inches	3	1	3.92
Fall plowing	do	3	1	2.58
Gang plow:				
Spring plowing	28 inches	5	1	5.15
Fall plowing	do	6	1	4.71
Tractor plow:				
Spring plowing	42 inches		1	8.67
Fall plowing	do		1	8.06
Disk harrow:				
Well-packed land	8 feet	4	1	17.4
Freshly-plowed land	do	4	1	15.5

[1] Experience has shown that the variation in such estimates is no greater than the variation in the results of efforts to obtain precise records by actual observation of farm operations, watch in hand. This latter method was tried out by the Office of Farm Management several years ago and discarded as impracticable. (See Dept. Bul. 3, "A Normal Day's Work for Various Farm Operations," p. 5.)

TABLE I.—*Summary of performance of implements, workmen, and crews in most common use in central Illinois*—Continued.

Implement or operation.	Size.	Horses.	Men.	Acres per day.
Spike-tooth harrow	20 feet	4	1	40.6
Corn planter:				
Check rower	42 inches	2	1	17.8
Drill	do	2	1	20.0
Corn cultivator:				
One-row riding	do	2	1	7.8
Two-row riding	do	3	1	13.5
Cutting and shocking corn by hand			1	1.28
Corn binder		3	1	7.66
Shocking corn after corn binder			2	6.66
Husking corn from standing stalks		2	1	1.67
Mechanical picker		5	1	6.8
Endgate seeder	35 feet	2	1	52.1
Grain drill	8 feet	4	1	14.9
Grain binder	do	4	1	17.9
Shocking oats			2	17.4
Mowing machine	5 feet	2	1	10.4
Tedder	10 feet	2	1	20.8
Sulky rake	do	2	1	20.8
				Minutes per load.
Unloading ear corn:				
With scoop shovel	42 bushels		1	28.1
With portable elevator	do		1	7.8
Unloading oats:				
With scoop shovel	85 bushels		1	25.6
With portable elevator	do		1	7.9
Loading hay:				
By hand	1.2 tons	2	3	31.4
With rake hay loader	do	2	3	23.2
Unloading hay into mow:				
By hand	do		3	41.0
With hay fork	do		4	18.2
Hauling and spreading manure:				
With spreader	65 bushels	3	1	45.6
With wagon box	44 bushels	2	1	68.4

GENERAL CONDITIONS.

Most of the farms in the area covered by this study are level, the soil is free from stumps and stones, and the fields are regular in shape. This permits more efficient use of farm machinery, especially of the larger sizes, than is possible in some sections of the country. The average size of all the farms from which the reports were obtained is 199.5 acres. An average of 32.1 acres per farm is never planted to crops, thus leaving an average crop area of 167.4 acres per farm. The land not planted to crops consists usually of the farmstead, roads, lanes, and possibly a small permanent pasture and wood lot. Corn is the principal crop, at least one-half of the crop area being devoted to the growing of this cereal. The oat crop is next in importance. Hay, mostly clover and timothy, and pasture in rotation, together occupy approximately the same acreage as oats. The most common rotation is (1) corn, (2) corn, (3) oats and (4) clover, or clover and timothy.

The average weight of the horses found on these farms is 1,355 pounds. On nearly two-thirds of the farms the horses weigh from 1,300 to 1,400 pounds, only a small percentage weighing less than 1,100 or over 1,500. These horses are considerably heavier than those

usually found on eastern farms. Thus a team of a given number of horses will do more work per day here than in the East when pulling implements of heavy draft, particularly plows and disk harrows, but probably the difference in weight has no effect on the amount of work done per day with lighter implements such as corn planters and cultivators. As far as could be determined from the reports received, the variation in the weight of the horses found on these Illinois farms was not great enough appreciably to affect the rate of doing work.

The average time spent in the field, exclusive of the time required in going to and returning from the field in the morning, at noon, and at night, as reported by these men is 10 hours and 10 minutes per day for spring work and corn cultivation; 9 hours and 55 minutes for haying and grain harvest; 9 hours and 30 minutes for fall plowing and preparing ground; and 9 hours and 20 minutes for corn harvest.

On most of these farms the keeping of live stock is not an important enterprise, and thus it is possible for the workmen to spend longer hours in the field than would be the case in a section where live stock, especially dairy cows, are kept in large numbers.

PLOWING.

Walking plows are used to such a limited extent in the locality studied that no attempt was made to obtain data concerning their operation. About 80 per cent of the farmers reported the use of sulky plows, about 80 per cent stated that they use horse-drawn gang plows, and 14 per cent reported the use of tractors for plowing.

The depth of plowing in the spring averages about 5.3 inches. Most of the men reported plowing from 5 to 6 inches deep in the spring, less than 5 per cent of them indicating a depth as great as 7 inches, and not over 15 per cent reporting less than 5 inches. The variations in depth are apparently not sufficient to affect the amount of work done per day.

The plowing was usually about 1 inch deeper in the fall than in the spring, more than 80 per cent of the men reporting depths of from 6 to 7 inches, and some reporting 8 inches. The average is 6.5 inches.

SULKY PLOW.

SPRING PLOWING.

The acres covered per day by 14- and 16-inch sulky plows in spring plowing are given in Table II. It will be seen from this table that a large majority of the farmers use 16-inch sulky plows, that nearly all of them are operated with three horses in the spring, and that 3 acres is an average day's work for this outfit.

TABLE II.—*Spring plowing with sulky plow.*

Width of plow.	Number of horses.	Number of reports.	Acres per day	
			Average.	Acreage most often reported.
Inches.				
14	3	37	2.96	3 (*21 reports*).
16	3	355	3.02	3 (*221 reports*).
16	4	34	3.34	Scattering.

This table also shows that for the comparatively few farmers using 14-inch sulky plows with three horses in spring plowing about 3 acres is an average day's work. While theoretically the 16-inch plow should cover about 15 per cent more ground in the same length of time, this apparently has not been found true in practice. However, the fact that such a large percentage of the farmers use 16-inch plows shows that they are more satisfactory for this locality. The reports of the small number of farmers who use four horses on their sulky plows show that the fourth horse increases the efficiency of the outfit by a little over 10 per cent.

FALL PLOWING.

The performance of 3- and 4-horse teams with 14-inch sulky plows and 3-, 4-, and 5-horse teams with 16-inch plows is given in Table III. The greater frequency of the 4-horse teams and even the use of some 5-horse teams is accounted for by the fact that plowing in the fall is usually about 1 inch deeper than in the spring, and also by the fact that the ground is generally dry and hard to turn.

TABLE III.—*Fall plowing with sulky plow.*

Width of plow.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Inches.				
14	3	16	2.48	2½ (*8 reports*).
14	4	20	2.75	3 (*9 reports*).
16	3	198	2.58	2½ (*95 reports*).
16	4	148	2.89	3 (*76 reports*).
16	5	16	3.20	Scattering.

On an average, outfits of the same size cover about a half acre less per day in the fall than in the spring, due not only to the more difficult conditions mentioned above, but also to the fact that the time spent in the field is about two-thirds of an hour less per day in the fall. As is the case in spring plowing, the 14-inch plow seems to cover practically as much ground per day as the 16-inch size, provided both are drawn by the same number of horses. The addition

of the fourth horse increases the efficiency of the unit by about the same percentage as in the spring plowing, and the addition of the fifth horse to the 16-inch plow results in a similar increase. The fact that nearly one-half of the farmers reported the use of more than three horses indicates that in fall plowing, excepting under favorable conditions, a sulky plow is somewhat of an overload for three horses.

GANG PLOW.

Over 450 men reported using horse-drawn gang plows on their farms. About 80 per cent of these plows have 14-inch bottoms. Most of the remaining plows have 12-inch bottoms. Some plows with 13-inch bottoms were reported, but the number was so small that no figures on their performance are given. Over three-fourths of the men who use gang plows also reported the use of sulky plows.

SPRING PLOWING.

An average day's work for four and five horses pulling 12-inch gang plows cutting a total width of 24 inches, and four, five, and six horses drawing 14-inch plows cutting a total width of 28 inches, is given in Table IV. About an equal number use 4 and 5 horse teams on this implement. (See fig. 1.) The most common performance reported for both the 4 and 5 horse teams is 5 acres per day, although on an average the 5-horse teams drawing 28-inch plows cover about one-quarter of an acre more per day than do the 4-horse teams and plow to a slightly greater depth.

TABLE IV.—*Spring plowing with gang plow.*

Width of plow.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Inches.				
24	4	24	5.02	5 (*15 reports*).
24	5	15	4.72	5 (*8 reports*).
28	4	148	4.92	5 (*87 reports*).
28	5	154	5.15	5 (*91 reports*).
28	6	68	5.40	5 (*30 reports*). 6 (*26 reports*).

The apparent inconsistency in the acres covered per day by the 4 and 5 horse teams with the 24-inch plows is probably due to the small number of reports entering into the average. Practically half of the men reporting on the 24-inch plows gave 5 acres as an average day's work, regardless of whether they used four or five horses.

FALL PLOWING.

Table V shows an average day's work in the fall for 5-horse teams with 24-inch plows, and 4, 5, and 6 horse teams with 28-inch plows. As compared with spring plowing, there is a marked increase in the

use of 5 and 6 horse teams, this being due to the same conditions that cause the use of larger teams on the sulky plows in the fall.

TABLE V.—*Fall plowing with gang plow.*

Width of plow.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Inches.				
24	5	20	4.40	4 (*10 reports*).
28	4	60	4.10	4 (*36 reports*).
28	5	118	4.56	4 (*45 reports*). 5 (*38 reports*).
28	6	153	4.71	5 (*73 reports*).

There is a decided decrease in the ground covered per day in the fall, the 28-inch plows and four horses accomplishing 17 per

FIG. 1.—The 2-bottom gang plow, with 5 horses, covers a little over 5 acres per day in spring and 4.71 acres in the fall. This is a popular outfit.

cent less than in the spring, the 5-horse outfits 11 per cent less, and six horses 13 per cent less. In fact, six horses cover on an average only as much ground per hour with these plows in the fall as do four horses in the spring.

COMPARISON OF SULKY AND GANG PLOWS.

A comparison of an average day's work for 16-inch sulky plows and 28-inch gang plows shows that so far as horse labor is concerned the gang plow drawn by four horses is the most efficient unit in both spring and fall. In the spring this outfit covers $1\frac{1}{4}$ acres per day per horse, while both the sulky plow drawn by three horses and the gang plow drawn by five horses cover 1 acre per day per horse. The gang plow drawn by six horses covers but nine-tenths of an acre per horse.

In the fall four horses with the gang plow cover 1.02 acres per horse, while three horses on the sulky plow and five horses on the

gang plow cover .86 acre and .91 acre per horse, respectively. Four horses on the sulky plow and six horses on the gang plow cover .72 and .78 acre per horse, respectively. However, the gang plow is evidently a heavy load for four horses in the fall, excepting under favorable conditions. The 28-inch gang is a somewhat heavier load for six horses, the most popular sized team used in the fall, than is the 16-inch sulky for four horses, but is a lighter load than the 16-inch sulky for three horses.

As far as man labor is concerned, the gang plow drawn by six horses is, of course, the most efficient unit both in the spring and fall, but when horse labor as well as man labor is considered, it is seen that the advantage of this largest unit is somewhat lessened.

TRACTOR PLOWING.

Table VI shows the daily performance for both spring and fall of 2 and 3 bottom 14-inch plows pulled by tractors, as given by the farmers using power outfits.

TABLE VI.—*Tractor plowing.*

Width of furrow.	Spring.		Fall.	
	Number of reports.	Acres per day.	Number of reports.	Acres per day.
Inches				
28	19	7.00	21	6.38
42	42	8.67	46	8.06

A comparison of the work done by tractor-drawn plows cutting 28-inch furrows with that of plows of the same size drawn by horses, shows that in the spring the tractor does about 30 per cent more work per day than six horses, and in the fall about 35 per cent more, and that it does about 40 per cent more than four horses in the spring, and 55 per cent more than four horses in the fall. The tractors plowed to approximately the same depth, and worked approximately the same number of hours per day as did the horses.

The acres covered per day per plow are from 15 to 20 per cent less for the 3-plow outfits than for the 2-plow machines. As compared with the horse-drawn sulky plow, the 3-bottom tractor plow does on the average from two and three-fourths to three times as much as a 16-inch sulky drawn by three horses in the spring, or the same implement drawn by four horses in the fall. (See fig. 2.)

The reports of over 600 tractor owners throughout the State of Illinois as summarized in Farmers' Bulletin 963, "Tractor Experience in Illinois," showed an average of $6\frac{1}{2}$ acres per day of 10 net working hours for 2-plow tractors and $8\frac{3}{4}$ acres for 3-plow machines. (Compare with Table VI.)

THE DISK HARROW.

The disk harrow is used on nearly every Corn-Belt Farm. Eighty-five per cent of the men from whom these reports were received own them. They are used for working up fall plowing in the spring and for preparing corn stubble for oats, as well as on freshly plowed ground. Practically all of these implements are single disks, and the 8-foot width is the most common, although the 7, 9, and 10 foot sizes are found on some farms. All of the men reporting 7- and 8-foot disks stated that they use four horses on them. Four horses were reported most often for the 9-foot size, although some farmers use five or six horses. Four, five, and six horse teams were reported for the 10-foot disk, the 6-horse team being the most common.

FIG. 2.—The 3-bottom tractor covers 8.67 acres per day in spring and 8.06 in the fall.

TABLE VII.—*Disk harrow on well-packed land.*

Width.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Feet.				
7	4	52	15.4	15 (*13 reports*).
8	4	350	17.4	18 (*86 reports*). 20 (*91 reports*).
9	4	15	18.9	Scattering.
10	6	17	23.5	Do.

An average day's work in going once over well-packed land (without any lap) for 7, 8, and 9 foot disks, drawn by 4 horses, and 10-foot disks drawn by 6 horses, is given in Table VII. The average performance of the same units in going once over freshly plowed land (without any lap) is given in Table VIII.

TABLE VIII.—*Disk harrow on freshly-plowed land.*

Width.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Feet.				
7	4	60	14.3	15 (*25 reports*).
8	4	368	15.5	15 (*111 reports*).
9	4	15	16.9	Scattering.
10	6	23	22.7	{20 (*7 reports*). {25 (*7 reports*).

Many farmers report that there is practically no difference between the rate of doing work on well-packed land and freshly-plowed land, as the disks must ordinarily be set at a somewhat greater angle in disking corn stubble or fall plowing, thus making the draft of the implement greater and overcoming the advantage of firmer footing for the horses. On an average, however, a day's work on well-packed land is from 1 to 2 acres greater than on freshly plowed land.

The 9-foot disk, drawn by 4 horses seems to be the most efficient unit so far as horse labor is concerned, this unit covering about 4.7 acres per horse per day on well-packed land, and 4.2 acres on freshly-plowed land. However, the fact that so many men are using 8-foot disks indicates that the 9-foot size is perhaps a slight overload for 4 horses.

A 10-foot disk makes the same load per horse for 5 horses as the 8-foot implement does for 4 horses, but most of these farmers who use 10-foot disks hitch 6 horses to them. While such an outfit permits one man to cover more ground per day than does any of the other units shown in the tables, the efficiency of the horse labor is less than when 4 horses are used with the 8-foot disk.

THE SPIKE-TOOTH HARROW.

Spike-tooth harrows ranging from 12 to over 25 feet in width were reported, and 95 per cent of the farmers stated that they hitch 4 horses to this implement. Fewer than 20 farmers using 3-section harrows, each section being from 4 to 5 feet wide, reported the use of 3 horses, and about the same number reported 5 and 6 horses for harrows 16 feet or more in width. (See Table IX.) Eighty per cent of these men use 4-section harrows, and about 50

per cent of these 4-section harrows have sections 5 feet wide, making a total width of 20 feet.

TABLE IX.—*Spike-tooth harrow (4 horses, once over, no lap).*

Number of sections.	Width of sections.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
	Feet.			
3	5	61	33.0	30 (*18 reports*). 40 (*20 reports*).
3	6	23	36.5	40 (*12 reports*).
4	4	96	39.3	40 (*53 reports*).
4	4½	63	37.2	40 (*34 reports*).
4	5	166	40.6	40 (*93 reports*).
4	5½	13	41.9	40 (*5 reports*).

The acreage covered per day increases with the increase in width of the harrow, but not directly in proportion to it. While the larger harrows are most efficient from the standpoint of both man and horse labor, the 20 and 22 foot harrows cover on the average only 2 and 1.9 acres per day per foot of width, respectively, while the 15 and 16 foot harrows cover 2.2 and 2.4 acres per day per foot of width.

Out of 422 reports summarized in this table, 217 gave 40 acres as an average day's work. However, very few men using the smaller sizes reported over 40 acres, while 15 per cent of those using the 20 and 22 foot sizes said that on an average they covered 50 acres per day.

PLANTING CORN.

Except where the fields are small and irregular in shape, nearly all the corn in this region is checked, so that it can be cultivated in both directions. The 2-row planter with check-rower attachment is used universally for this work, about one-half of the farmers making the rows 40 inches apart and the remainder 42 inches. (See Table X.) Theoretically the amount of ground covered per day when the rows are 42 inches apart should be about 5 per cent greater than when the rows are 40 inches apart, but the figures show that on the average there was practically no difference on these farms.

TABLE X.—*Planting corn with check rower.*

Width of row.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
Inches.			
40	259	18.0	20 (*105 reports*).
42	267	17.8	20 (*90 reports*).

The average performance of the 2-row planter in drilling corn, as reported by 136 farmers, is given in Table XI. Most of these men reported that they also used a check rower. As with the check rower there seems to be practically no difference between a day's work in drilling in rows 40 and 42 inches apart. However, on the average about 2 acres less per day are covered when checking than when drilling, this reduction in acreage being due probably to the time necessary to move and set the check-wire stakes, and the attention that must be given to the check-rower attachment.

Both in using a check rower and in drilling corn more men reported 20 acres per day than any other amount. However, the men using a check rower frequently reported from 15 to 18 acres as

FIG. 3.—The 1-row riding cultivator, the most common type, covers 7.8 acres per day.

a day's work, and less than 3 per cent gave over 20 acres, while 25 per cent of the reports on drilling gave more than 20 acres.

TABLE XI.—*Drilling corn with 2-row planter.*

Width of row.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
Inches.			
40	68	19.6	20 (*30 reports*).
42	68	20.0	20 (*21 reports*).

CULTIVATING CORN.

Practically every farmer in the area uses the 1-row, 2-horse riding cultivator. (See fig. 3.) About 40 per cent of the men stated that they also use 2-row cultivators (fig. 4), though only two men reported the use of the 2-row machine exclusively. (See Table XII.)

TABLE XII.—*Cultivating corn with 1-row, 2-horse riding cultivator.*

Width of row.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
Inches.			
40	244	7.9	{7 (*48 reports*). {8 (*119 reports*).
42	264	7.8	{7 (*61 reports*). {8 (*112 reports*).

It is usually not possible to make as good progress in the first cultivation as it is when the corn is larger, and sometimes difficulty is

FIG. 4.—The 2-row cultivator covers on an average 13.5 acres per day, one and three-fourths times as much as the ½-row cultivator.

experienced in going crosswise in checked rows. However, no attempt was made to obtain figures applicable to these different conditions, the farmers simply being asked to give their estimates of an average day's work in cultivating corn.

TABLE XIII.—*Cultivating corn with two-row cultivator.*

Width of rom.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Inches.				
40	3	90	14.0	{14 (*11 reports*). {15 (*31 reports*).
40	4	20	14.2	Scattering.
42	3	81	13.5	{14 (*14 reports*). {15 (*19 reports*).
42	4	11	15.1	Scattering.

It will be seen (Table XIII) that a majority of the farmers using the 2-row cultivator hitch three horses to it. It is of comparatively light draft, and the addition of a fourth horse apparently increases but little the ground covered per day.

While the 2-row machine theoretically should cover twice as much ground per day as the 1-row, in practice it covers on the average only about one and three-quarters times as much. This comparatively lower rate of work is probably due to the greater difficulty experienced by the operator in handling the larger machine and the larger team.

FIG. 5.—One man cuts and shocks by hand about 1.25 acres of corn per day.

About 65 per cent of the reports showed either 7 or 8 acres as an average day's work with the 1-row cultivator. About 55 per cent gave from 14 to 16 acres as a day's work for the 2-row implement, but only 6 per cent of them gave more than 16 acres.

CUTTING CORN.

The amount of live stock kept on these farms is small as compared to the amount of corn raised, and only a small part of the corn is cut either for fodder or ensilage, the remainder being husked from the standing stalks. Thus the work of cutting corn is not so well standardized as are some of the more important farm operations, and most of it is done by hand. Only about one-third of the farmers reported the use of corn binders.

CUTTING AND SHOCKING BY HAND.

Each of the farmers was asked to give his estimate of the amount of corn one man should cut and shock by hand in a day under vary-

ing conditions. Table XIV gives a summary of these estimates. Nearly all corn cut for fodder is put into shocks, either 12, 14, or 16 hills square, over two-thirds of the reports stating that it was the common practice to make shocks containing 196 hills (14 by 14). The most common performance reported when making shocks of this size was 20 shocks per day, but nearly as many men reported 25 and 30 shocks, practically three-fourths of the reports giving one or another of these three figures. (See fig. 5.)

FIG. 6.—Where conditions are favorable, the corn binder increases the efficiency of man labor 50 per cent.

TABLE XIV.—*Cutting and shocking corn by hand (one man).*

Number of reports.	Size of shocks.	Acres covered per day.
292	144, 196, and 256 hills.....	1.28

Yields of from 40 to 65 bushels were reported, but the variations in yield apparently were not great enough to affect the ground covered per day.

THE CORN BINDER.

An average day's work for corn binders drawn by two, three, and four horses is given in Table XV. (See fig. 6.) A majority of the binders were drawn by three horses, this unit doing on an average about 10 per cent more per day than the 2-horse unit. More than

half as many men reported the use of four horses as of three, but on the average the fourth horse increased the ground covered per day by less than one-tenth of an acre. Evidently the use of the fourth horse on this machine is not justified, excepting under unfavorable conditions.

TABLE XV.—*Cutting corn with binder.*

Number of horses.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
2	20	7.00	Scattering.
3	112	7.66	7 (*25 reports*). 8 (*30 reports*).
4	59	7.74	7 (*14 reports*). 8 (*22 reports*).

SHOCKING CORN AFTER CORN BINDER.

The average performance of 2, 3, and 4 man crews in shocking corn after the corn binder is shown in Table XVI. The most common crew used in this work, two men, covers about three-fourths of an acre more per day per man than do the 3-man crews, and 1.2 acres more per man than do the 4-man crews. However, on the average, the 2-man crews lack about one acre per day of setting up as much corn as a corn binder drawn by three or four horses cuts. The 3-man crew shocks on the average just as fast as the corn binder cuts the corn, while the 4-man crew can shock three-fourths of an acre more per day than is cut by the binder.

TABLE XVI.—*Shocking corn after corn binder.*

Number of men.	Number of reports.	Acres per day		
		Average per crew.	Average per man.	Acreage per crew most often reported.
2	95	6.66	3.33	5 (*25 reports*). 6 (*24 reports*). 8 (*21 reports*).
3	57	7.74	2.58	7 (*14 reports*). 8 (*17 reports*). 10 (*14 reports*).
4	15	8.53	2.13	10 (*7 reports*).

One man with a corn binder drawn by three horses, and three men to shock the corn after the binder, cut and shock, on an average, 7.7 acres per day, or about 1.9 acres per man, while one man by hand cuts and shocks on an average 1.28 acres per day. Thus the corn binder and three horses increases the efficiency of man labor for this operation by nearly 50 per cent. If a two-man crew is used for shocking after the binder, and they cover 7 acres per day, the efficiency of each

man is about 80 per cent greater than if they were cutting and shocking by hand. That more corn binders are not in use in this section is due to the fact that these machines are expensive, and the comparatively small amount of work for them to do, often less than a day per year, in a great many cases increases the cost per acre cut enough to offset this gain in efficiency of man labor.

HUSKING CORN.

Most of the corn grown in this section is husked from the standing stalk by extra help, which is paid at a fixed price per bushel. (See fig. 7.) The most common practice is to provide each workman with

FIG. 7.—Most of the corn grown in McClean County is husked from the standing stalk.

a wagon and team. Each man husks two loads of varying size per day, one in the morning and one in the afternoon, and hauls them to the crib and unloads them.

TABLE XVII.—*Husking corn from standing stalks (1 man and team).*

Yield per acre.		Number of reports.	A day's work.		
Group limits.	Average.		Average.		Number bushels most often reported.
	Bushels.		*Bushels.*	*Acres.*	
40 to 45 bushels, inclusive	42.6	121	78.2	1.84	80 (*47 reports*).
46 to 55 bushels, inclusive	50.2	370	81.8	1.63	80 (*150 reports*).
56 to 65 bushels, inclusive	60.2	38	87.1	1.45	Scattering.
Average of total, all reports	49.2	529	81.3	1.67	

Table XVII gives the daily duty of one man when husking from the standing stalk, with corn of different yields. The average of 529 reports on this operation shows 81.3 bushels, or 1.67 acres, as a day's work. The number of bushels husked per day increases with the yield, but not in proportion to it. One man husks on an average 9 bushels more per day in corn yielding 60 bushels per acre than in corn yielding under 45 bushels, but covers four-tenths of an acre less ground. The individual estimates range from 50 to 100 bushels, but over 200 of the 529 men reporting gave 80 bushels as an average day's work.

FIG. 8.—The mechanical picker increases the efficiency of man labor about 35 per cent, as compared with hand husking, but decreases slightly the efficiency of horse labor.

In this locality a bushel of ear corn is understood to consist of enough ears to make a bushel of shelled corn, the volume of a bushel of ear corn being approximately twice that of a bushel of shelled corn.

About one-tenth of the men reported the use of mechanical pickers for husking corn from the standing stalk. (See fig. 8.) Five or six horses are used to draw the machine, and from one to four men and teams were employed in hauling the corn from the field to the crib. The number of men and teams used for hauling the corn depends to a large extent upon the distance from the field to the crib and whether or not a portable elevator is used for unloading. Their crews are usually so arranged that the amount of corn husked and

hauled depends almost entirely upon the ground covered by the picker.

Table XVIII shows an average day's work for 40 of these machines drawn by 5 horses, and for 20 machines drawn by 6 horses. The addition of the sixth horse apparently results in an increase of only about three-tenths of an acre per day.

TABLE XVIII.—*Husking corn from the standing stalks with a mechanical picker.*

Number of horses.	Number of reports.	Amount husked per day.	
		Bushels.	*Acres.*
5	40	336	6.8
6	20	351	7.1

Twenty-six of the 40 men who report the use of five horses on the picker used two men and teams for hauling to the crib, making a total crew of three men and nine horses. Their average performance was 333 bushels per day, or 111 bushels per day per man employed, and 37 bushels per horse. As compared with husking by hand as given in Table XVII, the mechanical picker, if used with a crew of this size, increases the efficiency of each man about 35 per cent but decreases the efficiency of the horse labor by about 10 per cent. The work for the men with the mechanical picker is not nearly so heavy and does not require so much skill as does husking by hand, while the work of the horses is a great deal heavier.

SEEDING GRAIN.

Regardless of the fact that numerous experiments have shown that oats which are drilled give better yields under most Corn Belt conditions than do those which are sown broadcast,[1] a large majority of the farmers still broadcast their oats, using end-gate seeders attached to the box of an ordinary wagon for this work. No small grain except oats is raised on most of the farms and only about 25 per cent of the farmers reporting have considered it worth while to buy grain drills.

END-GATE SEEDER.

The width of cast of these seeders as reported by the users varies from under 20 to over 40 feet. The majority of the farmers, however, reported using seeders which seeded strips of from 28 to 37 feet on each trip across the field. (See Table XIX.)

[1] See Bulletin No. 136, University of Illinois Experiment Station, "Methods of Seeding Oats, Drilling, and Broadcasting." Also Farmers' Bulletin 892, "Spring Oat Production."

TABLE XIX.—*End-gate seeder.*

Width of cast.		Number of reports.	Acres per day.	
Group limits.	Average.		Average.	Acreage most often reported.
	Feet.			
18 to 22 feet inclusive	20.2	27	39.1	Scattering.
23 to 27 feet inclusive	25.8	34	44.0	Do.
28 to 32 feet inclusive	30.0	103	49.4	40 (*41 reports*). 50 (*18 reports*). 60 (*19 reports*).
33 to 37 feet inclusive	34.9	199	52.1	40 (*73 reports*). 50 (*32 reports*). 60 (*55 reports*).
38 to 42 feet inclusive	39.0	75	59.1	Scattering.

The acres covered per day increases with the width of cast but not in proportion to it, those sowing the narrowest strips covering almost 2 acres per day per foot of width, while the largest ones cover only a little over $1\frac{1}{2}$ acres per day per foot of width. For the seeders in most common use, those sowing strips from 30 to 35 feet wide, approximately 50 acres is an average day's work. However, there is a considerable variation in the area covered by seeders with the same width of cast.

GRAIN DRILL.

The drills reported vary in size from the small 5-tube machines drawn by one horse, used in drilling winter wheat between the rows of standing corn, to wide implements having 20 to 24 tubes. The distance between tubes varies from 4 to 8 inches, but on nearly one-half of the machines they were 6 inches apart, and the 6 and 7 inch drills include three-fourths of the total number reported. Over 90 per cent of all the drills reported are disk drills. The average performance of disk drills with 16 tubes 6 inches apart, drawn by four horses, is given in Table XX. There were not a sufficient number of reports on any other unit to give a reliable average.

TABLE XX.—*Grain drill.*

Number of tubes.	Distance between tubes.	Number of horses.	Number of reports.	Average acres per day.
	Inches.			
16	6	4	24	14.9

The figures show that one man and two horses, with an end-gate seeder seeding a strip 35 feet wide, cover nearly three and one-half times as much ground per day as do one man and four horses with a 16-tube disk drill. However, the broadcasted grain must be covered, and to complete the operation the ground must be gone over with either a spike-tooth or disk harrow in addition to the end-gate seeder.

To go over the ground with both an end-gate seeder casting 35 feet, and a 20-foot spike-tooth harrow drawn by four horses (see Table IX) requires about two-thirds as much man labor and half as much horse labor as is required for the 4-horse, 8-foot drill. To go over the ground with the seeder and with an 8-foot disk drawn by four horses (see Table VII) takes 15 to 20 per cent more man labor and just about the same amount of horse labor as is required for the drill. As far as quality of tillage, aside from the seeding, is concerned, the work done by a disk drill should be somewhat better than that done by a spike-tooth harrow, but not so good as that done by a disk harrow.

HARVESTING GRAIN.

THE GRAIN BINDER.

Table XXI shows an average day's work for binders of different sizes in grain that is standing well. Oats sometimes lodge badly, especially in wet seasons, and when this condition exists a great deal of time is lost by the binder, the ground covered often being reduced by as much as 50 per cent. The actual time lost in particular cases, or the average condition of the oat crop in this respect at harvest time, is difficult to estimate, and the farmers were asked to give their experience only in grain that was standing well.

TABLE XXI.—*Grain binder.*

Width.	Number of horses.	Number of reports.	Acres per day.	
			Average.	Acreage most often reported.
Feet.				
6	3	19	13.3	Scattering.
7	3	17	14.0	Do.
7	4	30	15.2	15 (*15 reports*).
8	4	471	17.9	15 (*87 reports*). 18 (*107 reports*). 20 (*178 reports*).

The table shows that a large majority of the men use 8-foot binders drawn by four horses. The averages indicate that the 7-foot machine drawn by three horses is the most efficient unit with respect to horse labor, 4.7 acres per day per horse being covered with this outfit, as compared with 4.5 acres for the 8-foot binder drawn by four horses and 4.4 acres for the 6-foot machine with three horses. While the fact that two-thirds of the men who have 7-foot binders use 4-horse teams with them indicates that this machine is a heavy load for three horses, a 7-foot binder and four horses is the least efficient combination shown in the table, each horse accomplishing nearly 15 per cent less than those on either the 6 or 8 foot machines.

SHOCKING OATS.

The average performance of 2, 3, and 4 man crews in shocking oats is given in Table XXII. The reports show that two men constitute the customary crew for this work on nearly four-fifths of the farms, and that they do on an average 17.4 acres per day, or half an acre less per day than is covered by an 8-foot binder drawn by four horses. The efficiency of the labor decreases decidedly with the addition of extra men to the crew, three men working together covering 2 acres less per day per man than in a 2-man crew, and four men covering nearly 3 acres less per man. Part of this reduction in efficiency is due to the fact that it is customary for the

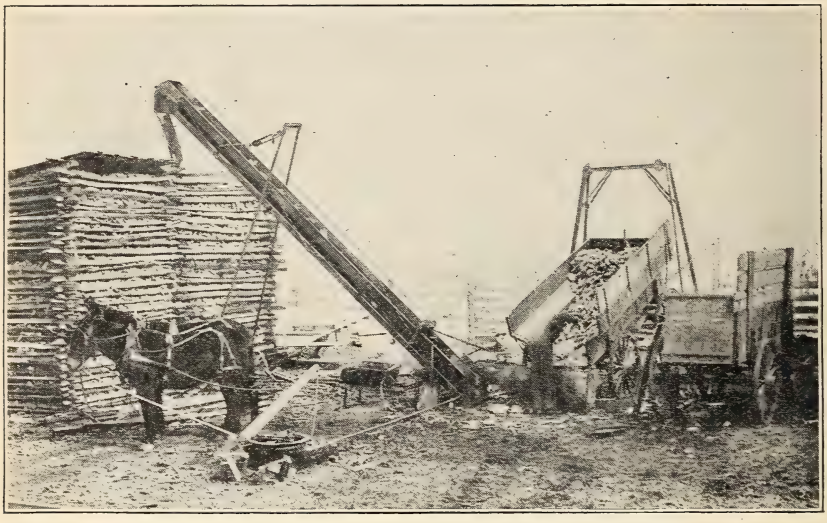

FIG. 9.—The portable elevator is generally used for unloading grain.

shockers to follow around the field closely after the binder, and no matter how many men are used they can not shock any more grain in a given time than is cut by the binder after which they are working.

TABLE XXII.—*Shocking oats.*

Number of men.	Number of reports.	Acres per day.		
		Average per crew.	Average per man.	Average per crew most often reported.
2	400	17.4	8.7	15 (*103 reports*). 20 (*143 reports*).
3	101	20.0	6.7	20 (*47 reports*).
4	16	23.4	5.9	20 (*7 reports*).
	517	.....	8.2	

The yield per acre of oats evidently has very little effect upon the amount of work done by the shockers. The average of 59 estimates

for 2-man crews in oats yielding 45 bushels per acre or less gave 17.4 acres per day; 281 estimates of the same sized crew with a yield ranging from 46 to 55 bushels gave the same area, and 60 estimates with a yield over 55 bushels gave 17.2 acres per day.

UNLOADING GRAIN.

Portable elevators are in general use in this locality for unloading corn and oats into the crib and bin, and in order to make possible a comparison of the efficiency of this practice with that of unloading with a scoop shovel the farmers were asked to estimate the time required to unload ear corn and oats by the two methods. (See fig. 9.) No attempt was made to differentiate between the elevators operated by gasoline engines and those where horses furnished the power.

TABLE XXIII.—*Unloading grain by hand and with portable elevator.*

Kind of grain.	Number of reports.	Average per load.	Time required to unload.	
			By hand.	With elevator.
		Bushels.	*Minutes.*	*Minutes.*
Ear corn	484	42.5	28.1	7.8
Oats	482	85.3	25.6	7.9

Table XXIII shows that on the average the elevator saves about 20 minutes in unloading a load of corn and 18 minutes in unloading a load of oats. This saving in time, and the release from the hard labor of scooping grain is worth considerable, especially to men who are husking corn by the bushel. The most frequent size of load of ear corn reported was 40 bushels. The most frequent size of load of oats was 100 bushels, but no load greater than 100 bushels was reported. Ten minutes was given most often as the time necessary for unloading these loads with an elevator, while 30 minutes was given most often as the time for unloading them with a scoop shovel.

HAYING OPERATIONS.

Hay is not as important on these farms as corn or oats, most of the farms having under 20 acres in this crop. This is reflected in the machinery used for harvesting hay, most of the mowers and rakes being of the smaller sizes, and a comparatively small number of hay loaders being reported. Nearly all of the hay is either clover, timothy, or clover and timothy, very few men reporting alfalfa. A study of the reports showed that the kind of hay and variations in yield apparently have little effect on the efficiency of the machines and crews, and no attempt has been made to take

these factors into account in the tables below. The average yield per cutting of all hay as given in these reports was 1.6 tons per acre.

MOWING.

Table XXIV gives the average acreage per day cut by 5 and 6 foot mowers. Only about 1 farmer in 40 reported the use of a 7-foot mower, and not one stated he was using an 8-foot machine. It will be seen that there are more than three times as many 5-foot mowers in use as 6-foot machines. As compared with the 5-foot mower, the 6-foot implement increases the efficiency of man and horse labor by about 15 per cent, and the 7 and 8 foot sizes would result in correspondingly greater increases. However, when mowing hay is such a small task, many farmers saying they have never used a mowing machine a full day, they evidently consider the investment in the larger and more expensive machines inadvisable. The smaller sizes are also more satisfactory for mowing weeds at the roadside and along fence rows.

TABLE XXIV.—*Mowing machine.*

Width of swath.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
Feet.			
5	322	10.4	10 (*158 reports*).
6	101	11.9	10 (*35 reports*). 15 (*27 reports*).

TEDDING.

About one-third of the farmers use hay tedders. Those reported range from 5 to 12 feet in width, and two horses are used on nearly all of them. An average day's work for the 8 and 10 foot widths is shown in Table XXV. There were not enough reports on any of the other sizes to give reliable averages. As both the 8- and 10-foot machines cover on an average a little over 2 acres per day per foot of width, the 10-foot tedder covers about 4 acres more per day than the 8-foot machine.

TABLE XXV.—*Tedder (2 horses).*

Width.	Number of reports.	Acres per day.	
		Average.	Acreage most often reported.
Feet.			
8	77	17.0	15 (*20 reports*). 20 (*26 reports*).
10	58	20.8	20 (*27 reports*). 25 (*13 reports*).

RAKING.

The sulky rake is in much more common use than is the side-delivery rake, over 200 men reporting the use of sulky rakes, while less than 40 reported side-delivery machines. Nearly everyone uses two horses on these implements. (See Table XXVI.)

TABLE XXVI.—*Hay rakes (2 horses).*

Width.	Sulky.		Side-delivery.	
	Number of reports.	Average acres per day.	Number of reports.	Average acres per day.
10 feet	141	20.8	22	20.4
11 feet	22	22.0	.....	.....
12 feet	58	23.4	.....	.....

Most of the rakes are 10 feet in width, this size being best for use with the 5-foot mowers. About 20 acres is an average day's work for both the sulky and side-delivery rakes of this width, and just half of the men using rakes of this size estimated an average day's work on their farms to be 20 acres. Twenty acres is also reported most often for the 11 and 12 foot rakes, but on an average the 12-foot rakes are shown to cover about $2\frac{1}{2}$ acres per day more than the 10-foot ones.

LOADING HAY.

Most of the hay is taken directly from the field to the mow. Very few sweep rakes or stackers are in use, and no attempt was made to secure data on them. The farmers were questioned only in regard to their experience in loading hay by hand and with the hay loader. Less than half the farmers reported the use of hay loaders. (See figs. 10 and 11.)

LOADING BY HAND.

The most common crew for loading by hand consists of two men to pitch and one man on the load. The only other crew reported by more than a small percentage of farmers consisted of but two men, one to pitch and one on the load. (See Table XXVII.) The average size of load is the same in both cases, 1.2 tons. The addition of the second man to pitch reduces the time required to put on a load by about 25 per cent. While the figures indicate that the two-man crew is slightly more efficient than are three men, the fact that a large majority of the crews consist of three men tends to show that this has been found to be a better arrangement when the entire haying operation is considered.

TABLE XXVII.—*Loading hay by hand (one man on load).*

Number of men to pitch.	Number of reports.	Minutes per load.	
		Average.	Time most often reported.
1	48	42.2	Scattering.
2	348	31.4	30 (*150 reports*).

HAY LOADER.

Table XXVIII gives the time required for two men besides the driver of the team to put on a load with the cylinder hay loader

FIG. 10.—In loading hay by hand the 3-man crew is most often used.

from the swath and from the windrow, and with the rake loader from the swath. More than twice as many men reported using rake loaders than those using cylinder loaders. Some reported the use of only one man on the load, but there were not enough of these to justify comparison between this practice and the using of two men. The table shows that, as far as time is concerned, there is very little difference between the efficiency of these two loaders. The average size of load put on with the loaders is 1.3 tons, nearly the same as that put on when the work is done by hand.

As compared with loading by hand, three men with a loader—two besides the driver of the team—put on a load in about 25 per cent less time than do three men by hand. There is the added advantage that the services of some one who can not do a full man's work with the pitchfork can be utilized for driving the team. If the hay is loaded directly from the swath the operations of raking

and bunching are of course entirely done away with when the loader is used.

TABLE XXVIII.—*Loading hay with cylinder and rake loaders (two men, besides driver of team).*

Kind of loader.	Loading from—	Number of men.	Number of reports.	Minutes per load.	
				Average.	Time most often reported.
Cylinder	Swath	2	17	21.9	Scattering.
Do	Windrow	2	27	22.0	Do.
Rake	Swath	2	80	23.2	{20 (*27 reports*). 30 (*26 reports*).
Average, all reports				22.8	

FIG. 11.—The hay loader reduces by about 25 per cent the time required to put on a load of hay.

Most of the hay racks in use here are 7 feet wide and 14 feet long. However, a considerable number 8 feet wide and 14 feet long, and some 7 by 16 and 8 by 16 feet were reported. The variations in the size of rack were evidently not great enough to affect the size of load.

UNLOADING HAY.

The farmers were asked to give their experience in putting hay into the mow both by hand and with a hayfork. (See Tables XXIX and XXX.)

UNLOADING BY HAND.

In unloading by hand the most common practice is to have one man on the wagon and two in the mow, and on an average it takes 41 minutes for this crew to unload a load of 1.2 tons. The table shows that it takes but very little longer for the 2-man crew, one man on the wagon and one in the mow, to put away a load. However, a crew of this size is ordinarily used only in small barns, or

when very little moving of the hay in the mow is to be done. Under such conditions one man in the mow can take care of the hay as fast as the man on the wagon can pitch it off, and a second man in the mow can not lessen materially the time required for the work. The 4-man crew, two men on the wagon and two in the mow, seems to be less efficient than either the 2 or the 3 man crew. With this crew it requires a total of about two and one-quarter hours of man labor to unload a load as compared with two hours with the 3-man crew and less than one and one-half hours with the 2-man crew.

TABLE XXIX.—*Unloading hay into mow by hand.*

Number of men on wagon.	Number of men in mow.	Number of reports.	Minutes per load.	
			Average.	Time most often reported.
1	1	67	43.4	30 (*16 reports*). 60 (*18 reports*).
1	2	216	41.0	30 (*68 reports*). 40 (*46 reports*). 60 (*35 reports*).
2	2	92	33.2	30 (*33 reports*).

UNLOADING WITH HAYFORK.

The crew for unloading with a hayfork always consists of one man on the load, a man or boy to drive the horse or team on the hayfork rope, and enough men in the mow to take care of the hay as fast as it can be gotten to them. As was the case in unloading by hand, the smallest crew seems to be the most efficient. The 3-man crew, one man in the mow, one on the load, and one to drive the hayfork team, uses 20 per cent less man labor per load than does the 4-man crew, and 35 per cent less than the 5-man crew. However, the fact that such a large majority report the use of two men in the mow indicates that unless there is but little work to be done in the mow two men are necessary to keep up with the hayfork.

TABLE XXX.—*Unloading hay into mow with hayfork (one man on load and one driving hayfork team).*

Number of men in mow.	Number of reports.	Minutes per load.	
		Average.	Time most often reported.
1	64	20.2	Scattering.
2	364	18.2	15 (*112 reports*). 20 (*105 reports*).
3	23	16.4	15 (*9 reports*).

The total hours of man labor required for unloading with 3 and 4 man crews is only a little more than half as great when a hayfork is used as when the work is done by hand. Besides the direct saving of time a boy can drive the horses attached to the hayfork rope, and

the work of the other men, especially the one on the wagon, is not as hard as when unloading by hand. The horses used on the hay-fork rope are usually the same as those used for drawing the hay from the field, and would be standing idle if the hay was unloaded by hand.

HAULING AND SPREADING MANURE.

In gathering data on the use of manure spreaders each farmer was asked to give the size of load ordinarily hauled (in bushels), the number of horses generally used, the most common distance hauled, and time required for one man to load, haul to the field, spread and return. The same information was obtained for hauling in a wagon box and spreading by hand. (See Table XXXI.)

The most common distance from the barn to the field reported was 80 rods, with an average of 75 rods for the spreader and 74 rods for the wagon. Sixty bushels was reported most often as a load for the spreader, but 50, 70, 75, and 80 bushels were each given as an ordinary load in more than 10 per cent of the reports. Thirty bushels was given most frequently as a load for the wagon, but 40, 50, and 60 bushels were each given as an ordinary load in from 10 to 20 per cent of the reports.

About 60 per cent of the farmers use three horses with the spreader, about 30 per cent use 4-horse teams and the remainder 2-horse teams. The size of the load and distance hauled, however, apparently have very little to do with the number of horses used. Two horses are nearly always used when hauling in a wagon.

TABLE XXXI.—*Hauling and spreading manure (time required to load, haul to field, spread, and return).*

	Number of reports.	Number of horses.	Distance hauled.	Size of load.	Time per load.
			Rods.	*Bushels.*	*Minutes.*
Wagon	312	2	74	44	68.4
Spreader	382	2,3,4	75	65	45.6

From Table XXXI it is evident that a given amount of manure can be handled in less than one-half the time with the spreaders in common use than with the wagons, the manure being handled at the rate of 1.4 bushels per minute with the spreader, and of less than seven-tenths of a bushel per minute with the wagon. The increase in efficiency is due not only to the saving in time when spreading the manure, but also to the fact that considerably larger loads are hauled in the spreaders and comparatively less time is spent in going to and from the field. Besides this saving in time the manure will usually be spread more evenly over the field, and the hard work of spreading with a fork is entirely eliminated.

COMPARISON OF ILLINOIS AND NEW YORK PRACTICES.

A comparison of the sizes of implements and teams in most common use in Illinois with those in most common use in western New York shows not only that larger teams and implements are in general use in Illinois, but that even where the implements and teams are of the same size one man in Illinois accomplishes more per day in nearly every operation than does one workman in New York.

Data regarding their rate of doing farm work were obtained from farmers of seven counties in western New York in 1915, and published in United States Department of Agriculture Bulletin 412, "The Normal Day's Work of Farm Implements, Workmen, and Crews in Western New York." With regard to the section where the data were obtained the bulletin says:

> The farm land is somewhat rolling, but not to an extent to reduce appreciably the average amount of work that can be done daily. Some of the heavier soils of the Dunkirk series can not be plowed as rapidly as can the more loamy soils of the Middle West. The presence of more or less stone throughout the section also operates to reduce the amount of work than can be done daily with plows. There are no local reasons why farm implements that are drawn over the land, like mowers, binders, rakes, etc., should not perform as much work daily here as anywhere. The horses used in western New York average 1,211 pounds in weight. The average net day in the field in spring and summer work was found to be 9 hours and 38 minutes, and in haying and harvest it is 9 hours and 49 minutes.

PLOWING, HARROWING, AND DISKING.

In Table XXXII are given figures for the most common sizes of implements and teams used in plowing, harrowing and disking, and the rate of doing work with them in the western New York area, together with similar figures for McLean County, Ill.

The daily acreages for plows in the Illinois area are averages of figures for spring and fall plowing from Table II to VI inclusive. The acreages for western New York are averages of figures for plowing on sod and plowing on stubble, as given in Bulletin 412. The daily acreages for the disk harrow for both areas are averages of its accomplishment on freshly plowed land and on well-packed land.

TABLE XXXII.—*Plowing, harrowing, and disking.*

Implement.	McLean County, Ill.			Western New York.		
	Most common size.	Number of horses.	Acres per day.	Most common size.	Number of horses.	Acres per day.
Walking plow				12-inch	2	1.56
Sulky plow	16-inch	3	2.80	14-inch	3	2.14
Gang plow	28-inch	5	4.85			
Tractor plow	42-inch		8.37	28-inch		[a] 4.50
Spike-tooth harrow	20-foot	4	40.60	8-foot	2	13.00
Disk harrow	8-foot	4	16.50	6-foot	3	9.00

[a] From Farmers' Bulletin 1004, "The Gas Tractor in Eastern Farming."

The most common unit for plowing in the western New York area is the 2-horse walking plow, and with it one man covers only about one-third as much ground per day as does one man with the 5-horse gang in central Illinois. Even with the 3-horse sulky, which is in use in both sections, the average accomplishment of these Illinois farmers exceeds that of those of the New York area by over 30 per cent. Part of this difference is doubtless due to the easier plowing conditions in Illinois, as mentioned above.

There is a greater difference between the acres covered per day by one man with the spike-tooth harrow in the two areas than with any other implement shown in the table, one man in central Illinois accomplishing over three times as much as one man in western New York.

OPERATIONS ON THE CORN CROP.

Table XXXIII shows in comparison the rates of doing work on the corn crop with the implements and crews in most common use in the two areas. The figures for planting apply to corn in rows 42 inches apart. In western New York corn is generally planted with the grain drill, this implement planting two rows at a time, covering about the same acreage per day as the two-row planter. The Illinois men use the planter exclusively for both checkrowing and drilling, and in drilling cover nearly twice as much per day as do the New Yorkers who drill with grain drills.

TABLE XXXIII.—*Operations on the corn crop.*

Implement or operation.	McLean County, Ill.			Western New York.		
	Most common size.	Number of horses.	Acres per day.	Most common size.	Number of horses.	Acres per day.
Grain drill				2-row	2	11.60
Corn planter (drill)	2-row	2	20.00	do	2	10.70
Corn planter (checkrower)	do	2	17.80			
Walking cultivator					1	4.10
Riding cultivator	1-row	2	7.80	1-row	2	7.10
Do	2-row	3	13.80			
Cutting corn by hand			1.28			1.12
Cutting corn with binder		3	7.66		3	5.70
Shocking corn after binder			2.97			3.35
Husking corn from standing stalks		2	1.67			
Husking corn from shock						.46

About a third of the reports from western New York stated that the corn was planted in rows 36 inches apart, the remainder being planted in rows 42 inches apart. The figures given in the table for western New York for the operations other than planting are averages of both sets of reports. The figures for the Illinois area are averages of the performance in corn where the rows are 40 and 42 inches apart.

On only one operation, that of shocking corn after the binder, do the western New York farmers accomplish more per man than do those in the Illinois area.

SEEDING AND HARVESTING GRAIN.

The sizes of implements and teams and the acres covered per day in drilling and harvesting grain, and the accomplishment of one man in shocking grain for the two areas are given in Table XXXIV. The larger implements and teams used in the Illinois area enable one man to cover more ground per day when seeding and harvesting grain, and each man covers a 10 per cent greater acreage in shocking in the Illinois area than he does in western New York. The figures for the binders and the shockers apply only to the oats crop in Illinois area, while those for western New York are averages for all grain.

TABLE XXXIV.—*Seeding and harvesting grain.*

Implement or operation.	McClean County, Ill.			Western New York.		
	Most common size.	Number of horses.	Acres per day.	Most common size.	Number of horses.	Acres per day.
	Feet			*Feet*		
Grain drill	8	4	14.9	6	2	10.0
Grain binder	8	4	17.9	6	3	10.4
Shocking	.....	.....	8.2	.....	.....	7.5

HAYING.

Table XXXV shows in comparison the work of mowers, tedders, and sulky rakes in the two areas. Five-foot mowers and 10-foot rakes are the most common sizes in both areas. It will be seen that all these implements cover more ground per day in the Illinois area than in western New York.

TABLE XXXV.—*Mowing, tedding, and raking hay.*

Implement.	McLean County, Ill.			Western New York.		
	Most common size.	Number of horses.	Acres per day.	Most common size.	Number of horses.	Acres per day.
	Feet			*Feet*		
Mower	5	2	10.4	5	2	9.0
Tedder	10	2	20.8	.....	2	14.3
Sulky rake	10	2	20.8	10	2	17.6

The data on hauling hay from the field and unloading it into the mow are not comparable for the two areas, and the figures afford no comparison of the efficiency of man labor for these operations. The western New York farmers were asked to give the number of tons that could be loaded, hauled to the barn or stack, and unloaded in a day by crews of different sizes, while the men of the Illinois area were asked for the time required to put on and take off a load with crews of different sizes. Bulletin 412 states, however, that the farmers in western New York "are on the average from 5 to 10 per cent more efficient in hauling in their hay than the average farmer of the country."

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